expectation than the astonishing sight that is step by step unfolded to our view by the actual performances. The nucleus is cut in two in such a manner that every portion of its net-like inner structure is divided with exact equality between the two daughter-nuclei, and the cell performs this spectacular feat with an air of complete and intelligent assurance. The net-like framework is spun out into long threads or chromosomes; these are divided lengthwise into exactly similar halves; they shorten, thicken, separate, and pass to opposite poles, and from the two groups formed are built up two daughter-nuclei, while the cell-body divides between them. Such a process in some respects seems to contradict all physical principles; but its meaning has now become perfectly plain. In a general way it means that the nucleus is not composed of a single homogeneous substance, but is made up of different and self-perpetuating components; and it means that these components are strung out in linear alignment in the threads so that they may be divided, or distributed in particular manner, by doubling of the threads. . . . The further conclusions which soon followed seemed at first sight completely incredible. Step by step the experi-mental analysis [by genetic studies in cross-breeding] built up the demonstration that the infinitesimal entities serially aligned in the nuclear threads are primary and indivisible units or factors of heredity (genes), each of its own specific kind and self-perpetuating by growth and division; that they are of definite number; that they are

separated by fairly definite and constant intervals; and that in their serial alignment *they follow a definite and invariable order*. When we try to reckon with this series of conclusions we find ourselves fairly gasping for breath. Such results are indeed staggering. . . . *Nevertheless they*